Acid Sump Area
Source Area
Remedial Action Plan

ATI Facility, Albany, Oregon

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Prepared by

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Acronyms and Abbreviations

µg/kg	microgram per kilogram
µg/L	microgram per liter
AC	asphaltic concrete
ASL	Applied Sciences Laboratory (contract laboratory in Corvallis, Oregon)
C	Celsius
Cis-DCE	cis-1,2-dichloroethene
CLSM	controlled low strength material
COC	chemical of concern
CWTS	central wastewater treatment system
CVOC	chlorinated volatile organic compound
DCA	1,1-dichloroethane
DCE	1,1-dichloroethene
DEQ	Oregon Department of Environmental Quality
DNAPL	dense nonaqueous-phase liquid
EPA	U.S. Environmental Protection Agency
GETS	Groundwater Extraction and Treatment System
gpm	gallons per minute
g/kg	grams per kilogram
GWTP	groundwater treatment plant
MCL	maximum contaminant level
mg/kg	milligram per kilogram
PVC	polyvinyl chloride
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
SLEP	Schmidt Lake Excavation Project
SOD	soil oxidant demand
TCA	1,1,1-trichloroethane
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
VC	vinyl chloride
VOA	volatile organic analysis

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1. Introduction

This report presents the work plan to implement additional remediation action in the Acid Sump Area of the ATI Millersburg (ATI), Albany, Oregon, facility (Site). Additional details have been added to the plan in response to U.S. Environmental Protection Agency (EPA) comments dated April 22, 2016 (*US EPA Comments Acid Sump Source Area Remedial Action Plan, Teledyne Wah Chang Superfund Site, Albany, Oregon)*, and comments dated June 17, 2016 *(EPA Additional Comments, Acid Sump Source Area Remedial Action Plan, Fabrication Area, Groundwater and Sediment Operable Unit, Teledyne Wah Chang Superfund Site, Albany, Oregon).*The Acid Sump Area is located in the northwest portion of the Site as shown in Figure 1-1. The remedial investigation revealed the presence of chlorinated volatile compounds (CVOCs) in Acid Sump Area groundwater above EPA's National Primary Drinking Water maximum contaminant levels (MCL; CH2M HILL, 1993). The Record of Decision for the Site (ROD; EPA, 1994) prescribed the actions ATI needed to take to mitigate the observed CVOC concentrations. In 2002, a long-term Groundwater Extraction and Treatment System (GETS) began removing CVOCs from the Acid Sump Area through extraction well FW-3.

In September 2007, ATI intercepted a source of 1,1,1-trichloroethane (TCA) while attempting to install an additional extraction well, FW-8, in the Acid Sump Area. Previous investigations and bioremediation efforts as a result of this interception were discussed in the *Revised Acid Sump Area Source Removal and Treatment Remedial Design Work Plan* (Design Plan; GSI, 2015a). Despite dramatically reduced concentrations of CVOCs in the contaminant plume, data collected during biannual groundwater sampling suggest that a persistent source of dense nonaqueous-phase liquid (DNAPL) exists in the subsurface adjacent to the location of the attempted installation of extraction well FW-8.

To make a concerted effort to achieve the groundwater cleanup goals established in the ROD for groundwater and sediments, ATI will implement additional remediation actions in the Acid Sump Area. This report provides the details for excavating and treating CVOC-impacted soils and groundwater in the vicinity of the attempted installation of extraction well FW-8. The planned remediation actions include the application of chemical oxidants in the bottom of the source area excavation. These chemical oxidants may have a localized impact on the bioremediation efforts implemented in 2007. Additional bioremediation treatment will be implemented in the source area, if needed, as indicated by groundwater monitoring.

2. Pre-Design Investigation

The Design Plan identified several data gaps that would be filled in predesign investigations at the Site. On August 3, 2015, three investigation boreholes were advanced in the northwest, southwest, and southeast margins of the planned excavation to collect additional subsurface data (see Figure 2-1 for borehole locations). Cascade Drilling, an experienced environmental driller licensed in the State of Oregon, advanced the boreholes to refusal in the Spencer Formation using a track-mounted sonic drill rig and 6-inch-diameter drill rods. Continuous core samples were collected from each borehole to confirm local stratigraphy, the vertical extent of the vadose zone, and the depth of the underlying Linn Gravel and Spencer Formation. Soil samples were collected for analytical determination of CVOC concentrations, assessing soil oxidant demand (SOD), and strength testing. The results of the soil studies are discussed in detail and incorporated into the excavation and soil treatment plans in the excavation and soil treatment sections of this report (Sections 4 and 5, respectively). Table 2-1, presented at the end of this report, is a summary of the data collected from the August 2015 field work. Appendix A presents the boring logs for the three investigation boreholes in addition to borehole logs for I-1, I-2, I-3, EI-5, IB-04, TMW-1, TMW-3, TMW-4, and TMW-5.

3. Remedial Action Plan

The remedial action is focused on removing the TCA source area in the Acid Sump Area through an excavation that is approximately 31 feet wide by 25 feet long by 16 feet deep. The size of the excavation is strictly constrained in all directions by the location of acid tanks, sumps, and utility corridors at the Site. The source area at attempted extraction well FW-8 and the two wells with the greatest historical concentrations of CVOCs, TMW-1 and TMW-4, are included within the excavation footprint. The excavation will be completed by Bob Barker Trucking (Barker), a construction firm with extensive environmental experience at the Site. Structural details of the excavation engineering are discussed in Section 4.

Approximately 460 cubic yards of soil will be removed from the Acid Sump Area and transported to the Schmidt Lake Excavation Project (SLEP) soil treatment pad. Soils will be mixed and treated with a chemical oxidant, activated sodium persulfate, until analytical results demonstrate that they meet the requirements for disposal in a Resource Conservation and Recovery Act (RCRA) Subtitle D landfill. GSI Water Solutions, Inc. (GSI), personnel will oversee the construction of the soil treatment pile and work closely with ATI’s staff and Barker’s staff to manage treatment activities within the soil treatment area. Details of the soil treatment handling and processing are presented in Section 5.

During the excavation, it is expected that CVOC-contaminated groundwater will enter the excavation. A temporary groundwater treatment plant (GWTP) consisting of excavation sumps, filter tank, air stripper, and treated water tank will be constructed to treat this groundwater. After analytical results from a batch of treated water verify the performance of the GWTP, treated water will be discharged to the Site’s central wastewater treatment system (CWTS). The details of the GWTP are presented in Section 6. The general layout of the excavation area project is shown in Figure 2-1 and includes the most recent analytical data from June 10, 2015.

4. Source Area Excavation

The Design Plan selected excavation and chemical oxidant treatment as the preferred remedial action for reducing source CVOC mass in the Acid Sump Area. This combination approach includes excavation and chemical oxidation components to provide the greatest certainty that high concentrations of CVOCs encountered in the Acid Sump Area are removed and treated. After the excavation has been completed to a total depth of approximately 15 feet, analytical soil samples will be collected to characterize CVOC concentrations in both the walls and the floor of the excavation. Next, a solid, prilled oxidizing agent will be applied to the accessible and exposed surfaces of the excavation. The in situ chemical oxidation is designed to provide some treatment for CVOCs remaining in soil and groundwater that cannot be removed from the excavation. Each of these steps is discussed in greater detail below.

The Design Plan proposed a structurally braced excavation that would remain open for several weeks to accommodate ex situ treatment of excavated soils. Treated soils then would be used to backfill the excavation. Since completion of the Design Plan, ATI personnel have decided it would be structurally beneficial to backfill the excavation with controlled low strength material (CLSM; i.e., lean concrete) and/or imported, clean fill rather than treated soils. A positive benefit of this strategy is that it will now be possible to complete the excavation in sections because it will no longer be necessary to keep the entire excavation open until all the excavated soils have met target treatment concentrations. Completing the excavation in sections instead of as a single open pit will provide a substantial reduction in risk to personnel and surrounding infrastructure. The designed excavation procedures and infrastructure protection methods are described in the following sections.

4.1 Delineation of Excavation Area

The design dimensions of the excavation are 31 by 25 feet, to a depth of about 14 to 17 feet, or more precisely, to the underlying Spencer Formation. The Design Plan identified a target excavation area of 25 by 25 feet, circumscribing existing well locations TMW-1, TMW-4, and I-1. Following discussions with EPA in July 2015, the excavation footprint was extended to 31 feet from west to east (Figure 4-1). This greater width will remove more potentially contaminated material from the source area, but also will require additional measures to protect the integrity of a below-grade acid pipe corridor located at the northeast corner of the excavation (see Figure 4-2). The excavation will remove contaminated silts and gravels to the top of an underlying siltstone formation (Spencer Formation) and will remove an estimated 460 cubic yards of potentially CVOC-impacted soils. The footprint of the excavation, however, may be modified during construction based on field conditions where structural stability or hazardous conditions are encountered. Moreover, extending the excavation based on field conditions (i.e., chasing the contamination) is not considered to be a viable option because of the limitations imposed from the existing pipelines, tanks, sumps, and other facility operations and infrastructure.

4.2 Preliminary Work

Before excavation activities commence, preliminary site work will be performed to address potentially active and inactive utilities within the excavation. Analytical samples for metals and semivolatile organic compounds will be collected from Acid Sump Area wells as part of the Site-wide monitoring that will be completed before the excavation project begins. ATI personnel will review Site drawings and utilities to positively identify active utility lines and corridors within the excavation area. An initial review of available Site drawings and discussion with ATI personnel identified subsurface utilities: an abandoned acid sump line in the western half of the excavation, two abandoned manholes, and an active stormwater line used by the Flakeboard facility to the northeast of ATI (Figure 4-1). As part of preliminary site work, the manholes and abandoned lines will be inspected, drained, and plugged as necessary. These abandoned lines, and others that are encountered throughout the excavation, will be removed and stockpiled as construction debris. Existing groundwater monitoring wells that lie completely within the soils to be excavated (i.e., TMW-1, TMW-4, and I-1) will be abandoned by a licensed well driller in accordance Oregon Water Resources Department regulations for monitoring well abandonment.

Groundwater depths in the excavation area are anticipated to be approximately 7.5 feet below ground surface (bgs) during the summer months. To allow for saturated zone excavation, a dewatering system will be installed. One to two sumps will be installed as part of the preliminary work effort and will be installed by overdrilling existing well TMW-1 and drilling a new sump along the western boundary of the excavation (Figure 4-2). Optional installation plans were discussed with EPA during the April 7, 2016, Site visit, but those options are not going to be pursued; the sumps will be located as initially described in the February 2016 Work Plan. Sumps will be constructed using 6- to 8-inch-diameter steel casing with perforation slots cut into the bottom 5-foot sections of the casings. Drain rock, to provide and maintain hydraulic conductivity during the project, will be placed around the outside of the casings. The Spencer Formation was logged in the Site investigation borings (northwest, southeast, and southwest; Figure 4-2) at about 14 to 17 feet below the existing paved surface. The sumps will penetrate the Spencer Formation by at least 12 inches. Soils excavated during sump installations will be temporarily stockpiled in a drop box until the soil treatment pile is constructed. Additional details about sump installations are provided in Figure 4-2 while details about extracted groundwater treatment are provided in Section 6.

4.3 Protection of Existing Infrastructure

GSI has retained a foundation/geotechnical engineer, David Running, PE, GE, of Foundation Engineering, Inc., to evaluate the geotechnical conditions of the excavation area and provide recommendations for reducing the risks to adjacent infrastructure while completing the excavation. David Running has completed numerous geotechnical investigations at the ATI facility and is familiar with Site operations and health and safety requirements at the facility. GSI also has retained a structural engineer, Joe McCormick, SE, of Pillar Consulting, Inc., to provide structural analysis and design of bracing structures employed during the excavation.

Based on Site observations and available infrastructure plans, multiple temporary and permanent bracing structures likely will be used. Areas of concern were noted near the active below-grade acid sump (tank) along the northern edge of the proposed excavation: an acid pipeline conveyance corridor leading to the acid sump from the southeast and an overhead acid line with a support column located close to the northern edge of the excavation. Before excavation commences, the following bracing structures will be installed:

- The acid sump conveyance corridor on the northeast side of the excavation will be underpinned to reduce the risk of settlement. The underpinning will extend to bedrock below the bottom of the excavation. One underpinning location will be completed at the northeastern corner of the excavation, where the excavation will undercut the conveyance corridor. The other underpinning will be completed to the south, outside of the excavation limits, to help support the structure in the event of caving of the east excavation sidewall. The approximate underpinning locations are shown in Figure 4-2. The exact locations and final trench dimensions will be finalized in the field.

- The underpinning locations will be trenched, as required, to construct a concrete grade beam beneath the acid sump conveyance corridor (perpendicular to its alignment). The grade beam may be supported on concrete piers constructed by drilling 12-inch-diameter (minimum) holes on each side of the conveyance corridor extending into the Spencer Formation and backfilling the holes with concrete. Alternatively, the underpinning may be completed by trenching perpendicular to the conveyance corridor and backfilling the trenches with CLSM.
- The overhead acid line will be supported during the excavation. A temporary beam will be installed below the north end of the existing beam that supports the acid line. The temporary beam will extend perpendicular to the pipeline and will be supported on temporary columns and footings installed east and west of the acid sump building. The approximate locations of the temporary beam and foundations are shown in Figure 4-2. Upon completion of the excavation and backfilling, the original support post will be put back into service. The temporary beam bracing will be designed by the structural engineer, who will provide ATI with necessary drawings for implementation of the structures.
- A utility pole located approximately 6 feet from the northwestern corner of the excavation may be temporarily braced using a utility pole derrick while excavating the northwestern corner, if deemed necessary by the structural engineer.
- A Flakeboard stormwater pipeline is known to pass through the excavation area with a suspected invert depth that rests atop the Spencer Formation. Actual depth of the historical stormwater line is unknown. In the event that the Flakeboard line is encountered at a shallow depth, the line will be uncovered, cut, and capped for the duration of the excavation. If the Flakeboard line is encountered atop the Spencer Formation, it will be left intact. The line will be repaired and reconnected as needed following completion of excavation activities. Before the start of excavation activities, ATI will attempt to produce a depth profile of the pipeline by sending a camera with a depth sensor down the pipeline.

The construction drawings show that the acid sump pit walls may be about 7 to 8 feet from the northern edge of the excavation and that the base of the acid sump pit lies approximately 13 feet below the paved surface (approximately 2 to 3 feet above the anticipated base of the excavation). Based on soil boring logs from the area, the acid sump pit likely bears on dense alluvial gravel underlain by shallow bedrock. Given the depth of the acid sump pit, and the horizontal distance to the excavation, there is a low risk that the excavation will undermine the foundation support for the acid sump tank. However, to reduce potential slough and increase protection to area structures, CLSM may be placed along the perimeter of the excavation to create a more effective barrier (see Section 4.4).

Although the acid sump plays a critical production role, ATI staff members indicated it may be possible to lower acid levels in the tank for 2 days. If this proves to be possible, then every effort will be made to complete perimeter excavations adjacent to the tank during that period. In all cases, excavation adjacent to the sump will be overseen by the foundation engineer, who is competent to evaluate the risk of undermining the foundation support for the tank.

As discussed in this section and below, the excavation and backfilling are to be completed in sections to maintain structural support for the infrastructure located adjacent to the sidewalls of the excavation. With this approach, the complete sidewall hydraulic bracing, described in the Design Plan, will not be required. The geophysical shoring of the acid sump conveyance corridor and the overhead acid line discussed above will be designed in consultation with the structural engineer.

4.4 Excavation Procedures

All personnel and contractors working on the project will go through ATI's awareness class for working adjacent to acids, such as hydrogen fluoride. A pre-construction meeting with ATI staff members will discuss area-specific best practices for working in the area, such as spill prevention, response, and treatment. The work exclusion zones for the excavation will be designed for the coordinated access by the department's staff to necessary valves, gauges, meters, and control devices.

Excavation equipment will access the Acid Sump Area from existing roads that enter the area from the west and the east (Figure 4-1). An equipment wash station will be positioned adjacent to the excavation area for construction equipment moving back and forth between operational areas of the project. Soil will be removed from the perimeter of the excavation first and be replaced with clean fill containing CLSM. When excavation and backfilling of the perimeter have been completed, the central portion of the excavation will be removed and backfilled in sections. The siltstone formation at the bottom of the excavation will be graded, as practical, toward the east to facilitate water transport to the sump. This may be done with a drop-tape or, more typically, by observing seepage and water flow at the bottom of the excavation to see that it is moving toward the sump.

The excavation will start in the northeast corner of the excavation to address the following concerns:

- To remove what is expected to be the highest contaminated soils first and reduce the opportunity for cross-contaminating clean fill materials.
- To provide a base depth measurement adjacent to the sump that can be used to ensure that the excavation bottom is properly sloped to the east.
- To take advantage of the inherent strength in the undisturbed soils in a sensitive portion of the excavation.
- Provide, at least initially, a safe flow of equipment and materials in one direction across the excavation.

The excavation advance during the project may vary from this plan depending on Site conditions, safe equipment operation concerns, and recommendations of the foundation engineer.

The excavation work will be completed as follows:

- Shoring will be provided for the adjacent infrastructure as described in Section 4.3.
- The existing asphaltic concrete (AC) will be saw cut along the perimeter of the excavation and the AC will be removed.
- With dewatering systems in place, the deeper excavation will begin in the northeast corner (see Figure 4-3, number 1). Soil in the perimeter of the excavation will be removed in approximately 3- to 4-foot-wide sections down to the Spencer Formation then backfilled with drain rock and CLSM (Figure 4-3). The depths to the Spencer Formation will be monitored during perimeter excavation and used to establish target depths for drainage of the interior excavation.
- Soil removal will follow the diagonal pattern shown in Figure 4-3 to provide time for the CLSM backfill to cure and harden. Soils not greatly impacted by CVOCs will be placed in the bottom of the soil treatment pile (see Section 5).
- After the perimeter of the excavation has been completed, the interior section will be removed in subsections to minimize lateral earth pressures acting on the CLSM sidewalls (Figure 4-4). The foundation engineer will be onsite to evaluate CLSM stability and provide cut slope recommendations.
- Source material and assorted debris encountered in deeper sections of the excavation will be handled in accordance with ATI's health and safety protocols and treated separately, as appropriate, in the soil treatment area. Any product encountered in the excavation will moved into overpacks while still in the excavation area.
- The excavation will extend to the relatively impervious Spencer Formation. The surface of the rock at the bottom of the excavation will be graded to drain toward the dewatering sump in the northeastern corner of the excavation (i.e., the area with the highest historical groundwater concentrations of CVOCs).

4.5 Backfill and Compaction

- The backfill will include a sequence of drain rock, chemical oxidant, filter rock, and crushed rock or CLSM as shown in Figure 4-4 and described below. Dewatering of the drain rock will be used to reduce the impacts of the dissolved or free-flowing contaminants from upwelling into the clean fill as the excavation progresses.
- Backfill for the perimeter sections will be composed of a drain rock and subsequent CLSM. Approximately 2 feet of angular drain rock (¾- to 1½-inch) and 6 inches of ¾-inch minus filter rock will be backfilled atop the Spencer Formation to allow drainage to the dewatering sumps. The remaining trench will be filled with CLSM to approximately 1 to 4 feet bgs.

- Within the interior section, a 2-foot-thick layer of drain rock (composed of ¾- to 1½-inch rock) will be placed at the bottom of the excavation, above the Spencer Formation. This layer will provide a conduit for drainage toward the excavation sumps. Chemical oxidant will be applied at a rate of 2.5 pounds per square foot above the drain rock (b) (4) as part of the proprietary mixture Klozur from PeroxyChem). The oxidant will be distributed by mechanical means, such as drop-pipes; personnel will not enter the excavation to complete this task. This corresponds to a total application in the excavation of approximately 2,000 pounds. Based on SOD and persulfate treatability studies completed using Acid Sump Area soils, a majority of the oxidant will remain as a residual to treat any contaminated groundwater flux after excavation dewatering ceases.
- A filter rock with a smaller diameter than the drain rock, a ¾-inch minus, will be placed above the oxidant. The filter rock will provide a filter course to reduce the risk of the overlying fill penetrating into and clogging the drain rock layer.
- Clean, imported, crushed gravel or rock, meeting ATI and/or the geotechnical engineer's specifications, will be used to backfill the remainder of the excavation. The fill (designated as structural fill in Figure 4-4) will be placed in lifts and compacted using hoe-pack or other means acceptable to the geotechnical engineer to meet ATI's engineering specifications for future property use. The CLSM in the perimeter of the excavation will not require compaction.
- Following completion of the excavation, the excavation sumps will be removed and abandoned with a mixture of bentonite and concrete. The surface of the excavation will be repaved with asphalt.

The routing of construction vehicles that move soil to the soil treatment pile or bring backfill material into the excavation will be determined by field conditions, the stage of the excavation, Site stability, and expediency. Whenever practical, haul routes will be established that move in one direction past the excavation. The western entry road has sufficient width to establish two separated lanes of traffic when one-way movement through the work area is not possible.

4.6 Analytical Sampling of the Excavation

To characterize soils that will be left in place, discrete samples will be collected from the four walls and bottom of the excavation. ~~Two~~ Four discrete samples will be collected from each sidewall and the bottom (total of ~~10~~ 20 discrete samples) in accordance with EPA Method 5035 and submitted to the CH2M HILL Applied Sciences Laboratory (ASL) in Corvallis, Oregon, for analysis.

The exact sampling locations will be determined on the basis of health and safety and structural stability concerns during the excavation. The same concerns are likely to require that the samples be collected from the bucket of the excavator or other mechanical means after removal to the surface. If this method is used, the soil samples will be taken from the interior of blocks of soil, rather than the surface, to reduce volatilization and possible contact with the bucket. An Encore™ or Terra Core™ sampler will be used to collect the sidewall and bottom samples. All samples will be field-preserved according to EPA Method 5035.

Table 4-1 outlines the analytical details to be used for the soil sampling. Samples will be transported under chain-of-custody protocol directly to ASL.

Table 4-1. Analytical Requirements for Excavation Soil Characterization Samples
ATI; Albany, Oregon

Parameter	Analytical Methods	Target Reporting Limit	Sample Container	Sample Preservation	Sample Location	Holding Time
Volatile Organic Compounds (VOCs)	EPA 5035 (sampling) EPA 8260B (VOC analysis)	0.2 mg/kg	Encore: capped Encore container Terra Core: (3) 40 mL VOA vials	Both: Cool to 4^0C Terra Core: Methanol and water proportioned to sample mass	• Each sidewall One: 0 to 7 feet One: 7 to 15 feet • Bottom Two: from floor	7 days

Notes:
EPA = U.S. Environmental Protection Agency
mL = milliliter
mg/kg = milligrams per kilogram
^0C = degrees Celsius
VOA = volatile organic analysis

5. Soil Treatment

Soil excavated from the Acid Sump Area will be brought to the soil treatment area located approximately ¼ mile to the west on the SLEP soil treatment pad (see Figure 5-1). Soils, and any excavation debris entering the soil treatment area, will be managed according the soil treatment decision-making flowchart shown in Figure 5-2. The following sections provide details about the processing and management of excavated soils and debris, target treatment goals, and analytical confirmation sampling.

5.1 Soil Treatment Pile Design

The soil treatment pile will be approximately 120 by 140 feet and located in the southwest portion of the SLEP soil treatment pad. The soil treatment pile will be constructed on top of a liner of reinforced polyethylene spread over the asphalt-paved soil treatment area. The liner will provide a separation between the pavement and the pre-treatment excavation soils.

The first step in the construction of the soil treatment pile will be to place an approximately 4-inch-thick layer of relatively clean soils on top of the liner. This relatively clean soil is expected to come from the top several feet of the excavation providing that soil screening with a photoionization detector (PID) confirms the CVOC concentrations in the soil are low. Previous investigations at the Acid Sump Area showed that field PID readings below 70 ppm correlated with laboratory test results (Table 2-1) that were well below target treatment values (Table 5-1). If PID readings in the top several feet are greater than 70 ppm, the base of the soil treatment pile will be built using clean imported fill. The 4-inch-thick layer atop the reinforced polyethylene liner will help protect the liner from tears when the soil treatment pile is turned and mixed.

Soils that do not contain free liquids will be brought directly to the soil treatment pile and spread to a maximum depth of approximately 2 feet.

5.2 Treatment of Soils with Free Liquids

Free water in the excavation will be extracted with sump pumps as detailed in Section 4. If soils with free liquids are encountered, they will be brought to the soil treatment area and placed in a 30-cubic-yard drop box located in the northern portion of the soil treatment area. When a sufficient amount of soil has accumulated in the drop box, the soil will be deposited into a rotary mixer located in the soil treatment area and mixed with dry soils until no free liquids are present. When the mixed soils are sufficiently dry they will be placed along with the other soils in the soil treatment pile. Engineering controls will be used to minimize the amount of wet or soupy excavated soils. A sump pump will be placed in the bottom of the drop box to remove visible free liquids, if present. Additional drop boxes will be brought to the soil treatment area if needed to process soils containing free liquids.

5.3 Excavation Debris Management

During the excavation, asphalt pavement, utility pipe, construction debris, and concrete may be encountered. These materials will be transported to the soil treatment area and processed in the debris area as shown in Figure 5-1.

The debris area is an approximately 30-foot by 30-foot section with a reinforced 12 mil polyethylene remediation liner at its base covered with 4 inches of clean soil fill. The clean fill will protect the integrity of the liner and retard any free liquids or products from damaging the underlying asphalt.

The excavation work is scheduled to take place in early August 2016. Historically, an average of 1 to 3 days of precipitation occurs in Albany, Oregon, in August, with less than 1 inch of total precipitation. Polyethylene sheeting (6 mil) will be kept on standby in the soil treatment area and used to cover the soil treatment pile if precipitation is forecast or seems likely to occur. In addition, precast concrete curbing will be placed along a portion of the downhill side of the soil treatment pile to limit runoff.

5.4 Selection of an Oxidizing Agent for Soil Treatment

Commonly used oxidizing agents for TCA and trichloroethene (TCE) remediation include Fenton’s Reagent, permanganate, and persulfate. Fenton’s Reagent, or hydrogen peroxide, catalyzed with iron under low pH was a popular remediation approach throughout the 1990s; however, because of safety concerns from off-gassing, Fenton’s Reagent was ruled out as an oxidizing agent for this project. Permanganate has been shown to effectively treat organics; however, the caustic nature of permanganate and the associated precautions necessary to minimize worker exposure make it a difficult and costly product to use.

Activated persulfate is relatively easy to work with and has been shown to effectively reduce TCA and TCE concentrations in contaminated soils. GSI has successfully used granular activated persulfate in two recent full-scale soil treatment programs where its ease of application and minimal health and safety issues made it the preferred oxidizing agent for those projects. In granular form, it is nearly dust-free and may be spread with an agricultural seed or fertilizer spreader.

A soil treatability study was conducted in October-November 2015. The study used soils from the Acid Sump Area that were spiked with TCA and TCE, and demonstrated that activated persulfate is capable of reducing CVOC concentrations to below the project target treatment concentrations for soils. The treatability study is presented in Appendix B. The design concentration of persulfate required to effectively remediate the excavation soils was determined to be 2 grams for each kilogram of soil.

5.5 Soil Mixing and Addition of Activated Persulfate

When the excavation is complete and soils in the soil treatment pile have been spread evenly, activated persulfate will be spread uniformly to the top of the pile. Persulfate will be mixed into the soils using a small bulldozer or skidsteer. The blade of the bulldozer will be set at an angle to the soils and parallel to the ground surface, such that soils are turned and the activated persulfate is mixed into the soil. The blade height will be set so that the liner under the soil treatment pile is not damaged.

Alternative methods for soil mixing were considered, however, the heterogeneity of excavated soils make alternative soil mixing methods impractical. Most available mixing equipment is designed for soil or fertilizer and cannot handle the gravels and cobbles found in soils at the Site. The chemical oxidant is highly visible and if mixing appears inadequate additional passes with the bulldozer or skid steer will be made.

It is anticipated that approximately 2,100 pounds of granular activated persulfate will be required to treat the soil treatment pile, assuming an excavation volume of approximately 14,000 cubic feet and a soil density of 75 pounds per cubic foot.

5.6 Volatilization of Organic Compounds from the Soil Treatment Pile

Volatilization of CVOCs from the soil treatment processes will comply with emission limits and reporting requirements for ATI’s Title V Air Permit (Permit No. 22-0547-TV-01), which limits the allowable discharge of CVOCs to 18 tons. ATI’s permit requires a 30-day notification for minor emissions modification. This notification will be completed at least 30 days before beginning remediation activities.

Soil samples were collected from the acid sump at various depths in August 2015 and analyzed for concentrations of CVOCs. Table 2-1 presents the analytical results of the sampling that was used to estimate the total amount of CVOCs that may volatilize during soil treatment operations.

The detected values of all CVOCs were added together and multiplied by a safety factor of 2.5 to estimate the average CVOC concentration in the excavation soils: 10 milligrams per kilogram (mg/kg). Assuming all CVOCs will volatilize, and that the mass the soil treatment pile is expected to be about 1.1 million pounds, the total theoretical volatilized mass will be about 11 pounds. A more accurate assessment of the volatilization for Title V reporting requirements will be completed during the course of the project using actual analytical results. It is not likely the discharges will exceed the emission limits of the permit.

5.7 Target Treatment Concentrations for Excavated Soils

Soil treatment and mixing will continue until analytical results confirm that target treatment concentrations of CVOCs have fallen below Oregon Department of Environmental Quality's (DEQ) risk-based concentrations for the soil ingestion, dermal contact, and inhalation exposure pathway for occupational receptors. Treated soils will meet DEQ's risk-based concentrations, or meet the treatment standards for soil found in the *Code of Federal Regulations* (40 CFR 268.49). Risk-based target treatment concentrations for excavated soils are shown in Table 5-1. ATI plans to send treated soils to a RCRA Subtitle D landfill.

Table 5-1. Target Treatment Concentrations for Excavated Soils
ATI; Albany, Oregon

Parameter	DEQ Risk-Based Concentration (ppm)
TCA	870,000
DCA	260
Trichloroethene (TCE)	51
DCE	29,000
cis-DCE	2,300
Vinyl chloride	4.4

Notes:
Based on soil ingestion, dermal contact, and inhalation for occupational receptors.
ppm = parts per million
DEQ = Oregon Department of Environmental Quality

5.8 Sample Collection

Approximately 1 week after activated persulfate has been mixed into the soil treatment pile, 12 discrete samples will be collected. Three samples will be collected from each quadrant of the soil treatment pile, as shown in Figure 5-1. If the target treatment concentrations are not met, additional confirmation samples will be collected after additional treatment is completed. This process will be repeated until target treatment concentrations are met.

Soil treatment pile samples will be collected using Encore™ or Terra Core™ samplers according to EPA Method 5035. The sampler will be pushed into a freshly exposed portion of the soil until it is completely filled with soil. Each sample will be placed immediately into an iced cooler. Discrete sample test results will be compared to target treatment concentrations presented in Table 5-1.

Samples will be transported under chain-of-custody protocol directly to ASL for analysis. These details are summarized in Table 5-2.

Table 5-2. Analytical Requirements for Treated Soils
ATI; Albany, Oregon

Parameter	Analytical Method	Target Reporting Limit	Sample Container	Sample Preservation	Sample Location	Holding Time
Volatile Organic Compounds	EPA 5035 (sampling) EPA 8260B (VOC analysis)	0.2 mg/kg	Encore: capped Encore container Terra Core: (3) 40 ml VOA vials	Both: Cool to $4^{0}C$ Terra Core: Methanol and water proportioned to sample mass	3 discreet locations for each quadrant (Figure 5-1)	7 days

Notes:
EPA = U.S. Environmental Protection Agency
mg/kg = milligrams per kilogram
°C = degrees Celsius
VOA = volatile organic analysis

Clean dedicated sampling equipment will be used to collect all soil treatment samples. Appropriate decontamination practices will be used on all non-disposable sampling equipment. Decontamination procedures to be followed by all personnel will include the following steps:

1. Remove loose soil using appropriate tools.
2. Rinse and scrub equipment in tap water until all visible dirt has been removed.
3. Soak and scrub equipment in Liquinox solution.
4. Rinse equipment with tap water to remove soap.
5. Rinse equipment with deionized water.
6. Allow equipment to air dry.
7. Wrap and cover equipment in aluminum foil until next use.

Quality assurance (QA) samples will be collected at the soil treatment pile. Field duplicate soil samples will be collected to provide data on the precision of sampling efforts and laboratory analysis. A field duplicate will be collected for each round of sampling that takes place. If non-dedicated sampling equipment is used to collect an analytical sample, a rinsate blank will be collected on that piece of equipment.

Analytical reports from ASL will be submitted with a case narrative, a copy of the chain-of-custody form, and a cover letter that summarizes any QA or other analytical issues that were detected. Electronic deliverables will be requested for each sampling event. Data will be provided in a normalized flat file format.

6. Excavation Groundwater Treatment

Groundwater extracted from the excavation area will be treated by the GWTP. The GWTP will filter and store groundwater from the excavation and remove CVOCs by employing a high-efficiency air stripper. Dewatering and treatment will begin approximately 2 weeks before the main excavation commences through the dewatering sumps described in Section 4. Groundwater extraction and treatment will continue at least until the excavation is backfilled above the static groundwater table.

Design details and calculations for the GWTP are presented in the following sections and in the attached figures, tables, and equipment specifications. Conservative assumptions were used for dewatering pumping rates, influent CVOC concentrations, treatment efficiency rates, and groundwater storage capacity to provide a level of flexibility and safety during dewatering and treatment operations. Verification testing of treated groundwater from the GWTP will take place initially to confirm that the treatment system is attaining CVOC target treatment concentrations before discharging treated water to the Site's CWTS.

6.1 Determination of Design Influent Concentrations

As with the soils removed during the excavation, TCA and its associated daughter products are the primary chemicals of concern (COC) in the excavation groundwater; concentrations of TCA as high as 730,000 micrograms per liter (μg/L) and concentrations of TCA breakdown products as high as 120,000 μg/L have been detected in groundwater samples collected from wells near the excavation area. Concentrations of TCE as high as 4,000 μg/L and TCE breakdown products as high as 60,000 μg/L have been detected in groundwater extracted from the excavation area. Although these elevated concentrations are not likely to represent the typical or average CVOC concentrations that will be encountered during dewatering activities, the GWTP was designed to effectively treat these concentration levels before discharging into the Site's CWTS.

The data used to estimate concentrations of CVOCs that may be encountered in extracted groundwater are presented in Table 6-1 (located at the end of this report). Concentrations of CVOCs recorded in temporary monitoring wells TMW-1, TMW-3, TMW-4, and TMW-5 from 2012 through 2015 were used to determine the design influent concentrations to the GWTP (GSI, 2015b). Specifically, concentrations of CVOCs from the four wells were averaged to determine a design influent concentration. It was assumed that because these wells are located adjacent to the known source area (at attempted extraction well FW-8) that overall groundwater concentrations from the excavation are likely to be lower. Thus, these design influent concentrations provide a conservatively high estimate of CVOC concentrations that may need to be treated by the GWTP.

6.2 Design Treatment Concentrations

Target treatment concentrations for the GWTP are presented in Table 6-2 along with the design influent concentrations. Treated groundwater from the GWTP will be discharged into a nearby drain in the Acid Sump Area that leads to the CWTS. The target treatment concentrations selected for the system are the MCLs for organic chemicals from the Table of Regulated Drinking Water Contaminants (EPA, 2010).

Table 6-2. Excavation Area CVOCs and Target Treatment Concentrations
ATI; Albany, Oregon

Chemical of Concern	Design Influent Concentration Requiring Treatment[1] (µg/L)	Target Treatment Concentration in GWTP Effluent – MCLs[2] (µg/L)
1,1,1- TCA	280,000	200
1,1-DCA	36,000	50[3]
1,2-DCA	1,000	5
Chloroethane	13,000	25[3]
Trichloroethene (TCE)	2,000	5
cis-1,2-DCE	1,000	70
trans-1,2-DCE	1,000	100
1,1-DCE	20,000	7
Vinyl Chloride	1,000	2
Tetrachloroethylene (PCE)	1,000	5

Notes:
[1]See Table 6-1 for influent concentration calculations.
[2]MCL = maximum contaminant level values from the U.S Environmental Protection Agency (EPA) Table of Regulated Drinking Water Contaminants
[3] No MCL for this compound
GWTP = groundwater treatment plant
CVOC = chlorinated volatile organic compound
µg/L = microgram per liter

6.3 Groundwater Infiltration Rates and GWTP Components

Individual components of the GWTP have been sized to handle the groundwater extraction rates anticipated during the dewatering operations. The GWTP has been designed to handle incoming flows and effectively reduce influent CVOC concentrations to levels below the target treatment standards (i.e., MCLs). Excess capacity and operational capability have been included in the design to accommodate the processing of water volumes or influent concentration levels that exceed the conservative design estimates.

The estimated groundwater infiltration rate was calculated and used to size the pumps and components of the GWTP. Darcy's equation was applied while treating the excavation as a single large well or sink in an unconfined aquifer. Hydraulic conductivity for the equation was determined using previous investigations in the Fabrication Area at the ATI facility during the construction and implementation of the GETS (CH2M HILL, 2005). A range of radius of influence to drawdown values then was examined to estimate a range of potential infiltration rates into the excavation. Figure 6-1 presents the rationale and calculations used to establish a conservative steady state infiltration rate of 15 gallons per minute (gpm). In addition to being selected from the high range of potential infiltration rates, 15 gpm is conservative because it is based on the entire excavation being open at once instead of in smaller segments that are backfilled before moving to other sections, as described in Section 4.

Using the design influent CVOC concentrations and groundwater infiltration rates, individual treatment components were selected that will effectively handle and treat the predicted concentrations and water volumes. Figure 6-2 presents the design details of the

GWTP and the locations of the individual treatment components at the Site. Sump pumps will remove water from the excavation and discharge it into a filter tank. A pump at the filter tank discharge will drive water through an air stripper and into a treated water tank. From there the treated water will be directed through a nearby chemical drain leading to the Site's CWTS. Details of these components of the GWTS are presented below.

Sump and transfer pumps for the GWTP are sized to handle designed flows and take into account expected losses through elevation changes in the system and the flow resistance of treatment system components, which include piping and associated hardware (e.g., valves, flow meters, manifolds, etc.). Sump pumps used to dewater the excavation will be provided by Barker. Semi-transparent braided polyvinyl chloride (PVC) tubing will be used to transport water between system components to minimize pinching and kinking of the lines during pumping operations and to provide a capability to visually inspect water movement through the lines. Connections in the tubing will be made with quick-connect, or Camlock™ fittings to allow quick adjustment to the changing footprint of excavation operations and provide for continued uninterrupted production activities at the facility.

Solids suspended in groundwater have the potential to foul bubble plates mounted between the air stripper trays, which can lead to reduced treatment efficiency. To prevent fouling of the air stripper, water extracted from the excavation first will be pumped into a filter tank; the 20,000- gallon BakerCorp Open Top Tank, shown in Figure 6-2. Solids present in the groundwater will filter out of solution in three internal chambers separated by fabric weirs with 150-micron mesh screens. Design specifications for the BakerCorp tank are provided in Appendix C along with a photo of the fabric weirs. In addition to serving as a filtration tank, the 20,000-gallon filter tank provides a water storage capability that can be used to accommodate greater than expected dewatering volumes or additional reserve capacity should downstream treatment components need to be shut down or require maintenance. The extra design capacity of the filter tank will provide the ability to continue dewatering and filtering water from the excavation during the night if that is considered necessary or beneficial to the safe and timely completion of the project.

A Geotech LO-PRO III air stripper will be used to treat concentrations of CVOCs to below target treatment concentrations (i.e., MCLs). The LO-PRO III is designed to process flows of 1 to 60 gpm, which are well above the anticipated infiltration and dewatering rates. Technical personnel at Geotech Environmental calculated CVOC removal efficiencies for the LO-PRO III using the design influent concentrations for the excavation and a flow rate of 30 gpm through the air stripper. The calculations show that CVOC concentrations will be reduced to levels below target treatment concentrations after a single pass through the air stripper with the possible exception of 1,1,1-TCA if the concentrations equal or exceed the conservatively high design influent concentrations. In the event that verification sampling shows that one or more CVOCs is not reduced below the MCL, either additional passes will be made through the air stripper or a second air stripper will be brought online. Design specifications for the LO-PRO III air stripper and the associated removal efficiency calculations for the project COCs are presented in Appendix C.

Water pumped through the air stripper then will be pumped to a 6,500-gallon polyethylene treated water tank for use in confirmation sampling for target treatment concentrations during project startup operations. After target treatment concentrations have been confirmed water will be discharged to a chemical drain and the Site's CWTS. In addition to serving as a sampling station for treated effluent, the treated water tank will provide additional water storage capacity for the project. Specifications for the treated water tank are provided in Appendix C.

6.4 GWTP Setup and Operation

The GWTP will be assembled before the operation of the dewatering sumps. The filter tank, air stripper, and treated water tank will be scheduled to arrive onsite at least 2 weeks before the excavation work. Figure 6-2 shows the locations for different system components at the Site and the routing of the piping/tubing to convey untreated and treated groundwater. The filter and treated water tanks and air stripper will be set up to the west of the Acid Sump Area excavation, to be away from construction equipment and operations. Treated water will be routed away from excavation activities to a chemical drain that leads to the Site's CWTS.

Concurrent with the setup of the GWTP, two dewatering sumps will be installed at opposite ends of the excavation area 2 weeks before full-scale excavation activities begin, as described in Section 4. As soon as the GWTP is assembled and the dewatering sumps are installed, the sump pumps will be turned on to begin filling the filter tank. Initial dewatering rates will be assessed and compared to designed rates to refine subsequent extraction rates from the excavation. During the first week of operation, before excavation activities, the GWTP will extract only 6,000 gallons to assess the efficiency of its components. After sufficient treatment has been confirmed, the GWTP will be dewatering on a continuous basis.

Design calculations indicate that one pass through the air stripper will bring treated groundwater below the target treatment concentrations for CVOCs, with the possible exception of 1,1,1-TCA. To confirm the calculations and performance of the air stripper, treated water samples will be collected during the GWTP startup. Collocated samples will be collected of the pre-treated and post-treated water from sample ports positioned downstream of the filter tank and treated water tank (see Figure 6-3). One sample pair (untreated and treated water) will be tested with an AQR Color-Tec field test kit for CVOCs while the other sample pair will be sent to ASL for EPA 8260B analysis of CVOC concentrations. The field test kit has been widely used to help characterize CVOC concentrations at many remediation sites for many years (EPA, 2004). When paired with site-specific analytical data, it provides an accurate total CVOC assessment from approximately 5 µg/L up to 1 million µg/L.

The sequence of initial confirmation sampling will consist of the following steps:

- After approximately 6,000 gallons have been pumped from the excavation into the 20,000-gallon filter tank (week 1), two collocated water samples will be collected from the filter tank discharge sample port to determine the influent concentration of total CVOCs.
- One sample will be analyzed with a field test kit and the other sample will be submitted to ASL.

- After the initial untreated water sample has been collected, approximately 5,000 gallons of water from the filter tank will be pumped through the air stripper and into the 6,500-gallon treated water tank. A second set of collocated samples will be collected from the discharge sample port at the treated water tank and analyzed by both the field test kit and ASL to determine the treated effluent concentration of CVOCs.
- Water in the treated water tank will be held until confirmation sampling confirms that the GWTP is producing treated water suitable for discharge into the Site's CWTS.

Results from the analytical sampling will be used to determine if additional treatment strategies need to be implemented. Water may be recirculated back through the filter tank for an additional pass through the air stripper or additional air stripper(s) may be added to the treatment train. After the field test kit has been calibrated to laboratory analytical results, it will be used to confirm that the influent concentration of CVOCs lies within the range of values that can be effectively treated by the air stripper. The engineering goal of the treatment system is to provide a safe, continuous discharge of water meeting target treatment concentrations to the CWTS while continuing to accept input flows from the excavation, if required.

If dewatering rates are much lower than anticipated (e.g., 1 gpm), several days may be required to extract the initial 6,000 gallons; thus sufficient time must be allowed for initial testing of the treated water before the excavation begins. After treatment cycle samples have been collected, the GWTP and sump pumps will be shut down. After the analytical results confirm that the target treatment concentrations shown in Table 6-2 have been attained, and the number of treatment cycles required to attain them, dewatering of the excavation area will commence by restarting the sump pumps and filtering water for subsequent treatment in the air stripper.

Figure 6-3 presents the flow schematics and operations of the GWTP during the daytime and nighttime work shifts. During the daytime, as much water as practical will be processed through the air stripper and discharged to the Site's CWTS. The influent and effluent CVOC concentrations will be monitored so that treated water may be discharged directly from the air stripper(s) to the CWTS without passing through the treated water tank. An effort will be made to monitor and make as much room as possible available in the filter tank to accommodate any required increase in dewatering rates during the excavation. In short, the plumbing infrastructure has been designed to provide maximum flexibility to move, filter, treat, recycle, and discharge groundwater, as required under unanticipated conditions.

At night, for health and safety reasons, the air stripper and system components downstream of the filter tank will not be operated unless a dedicated operator is provided to monitor the equipment. However, dewatering of the excavation into the filter tank through the sump pumps may need to continue at night at controlled rates to ensure that the water level in the excavation does not recover. Recirculation of water in the filter tank may be conducted for additional filtering and passive stripping. Continuous operation of the GWTP may need to occur during nighttime hours if water storage capacity is depleted. However, no water will be discharged to the Site's CWTS during nighttime hours without the supervision of a dedicated operator. No equipment will be left in an operational state without the coordination, inspection, and monitoring of ATI personnel.

After the excavation is backfilled above the static groundwater table, the GWTP may be shut down and disassembled. Solids that have accumulated in the filter tank will be removed and transported to the soil treatment area for processing, as described in Section 5. Rental tanks and equipment will be decontaminated as required by the tank vendors.

6.5 Sample Collection

To determine the efficiency of the GWTP and ensure that target treatment concentrations are being achieved before discharge to the Site's CWTS, groundwater samples will be collected and tested for concentrations of CVOCs. A dedicated sampling port will be installed downstream of the filter tank and downstream of the treated water tank for collecting groundwater samples for both untreated and treated water. The sampling ports will be opened slightly during pumping to divert groundwater through the sample collection port and into the sampling containers. The ports will be covered during routine operations to keep them free from contamination and will be cleaned and rinsed with Liquinox and deionized water before collecting a sample.

The groundwater will be analyzed for CVOCs (TCA, TCE, and their daughter products) by EPA Method 8260B. Table 6-3 outlines the analytical details for the groundwater samples that will be transported under chain-of-custody protocol directly to ASL with an expedited turnaround time to avoid delays in the processing and discharge of groundwater.

Table 6-3. Analytical Requirements for Untreated and Treated Groundwater Samples
ATI; Albany, Oregon

Parameter	Analytical Method	Target Reporting Limit	Sample Container	Sample Preservation	Sample Location	Holding Time
Volatile Organic Compounds	EPA Method 8260B	0.5 µg/L	3 40-mL glass, Teflon-lined septum	HCL pH < 2, Cool to 4^0C	*Influent* - sample port before air stripper *Effluent* - sample port after treated water tank	14 days

Notes:
EPA = U.S. Environmental Protection Agency
HCL = hydrochloric acid
µg/L = microgram per liter
mL = milliliter
^{0}C = degrees Celsius

Sample collection for the collocated AQR Color-Tec sampling is similar to standard groundwater sampling for CVOCs; a new dedicated 40-ml VOA vial is filled for analysis at the same time vials for the laboratory are being filled. Because the samples are analyzed right after collection, they are not preserved or iced. The analysis process is similar to that used for Draeger Tubes, which have long been the health and safety standard for the detection and analysis of hazardous chemicals. A piston pump is used create a vacuum and draw CVOCs from the sample vial through a dedicated extraction needle. The purged CVOCs are drawn through colorimetric tubes, which employ an oxidizer (PbO_2) and catalyst (H_2SO_4) to produce hydrogen chloride that then discolors a reagent in the tube. Dedicated and disposable equipment is provided for the analyses by the field test kit vendor including vials, extraction needles, carbon filters, and test tubes.

6.6 Estimated Mass of CVOCs Removed during Groundwater Treatment

The quantity of CVOCs that could be emitted during groundwater treatment was determined by multiplying the design extraction rate of 15 gpm by the design influent concentrations shown in Appendix C and a dewatering period lasting 15 days (1 week of pre-excavation dewatering + 8 days of excavation dewatering) plus the additional 6,000 gallons extracted during the GWTP startup. Table 6-4 shows that the excavation project could emit up to 980 pounds of CVOCs during the dewatering and treatment operations. As discussed in Section 6.1, the dewatering rates and influent concentration estimates were conservatively biased high and this is reflected in the estimate of 980 pounds.

Table 6-4. Estimated CVOC Removal during Groundwater Treatment Operations
ATI; Albany, Oregon

Chemical of Concern	Design Influent Concentration (µg/L)	Design Dewatering Rate (gpm)	Length of Dewatering Period[1] (d)	Mass of CVOC Removed (kg)	Mass of CVOC Removed (lb)
1,1,1- TCA	280,000	15	15	350	771
1,1-DCA	36,000			45.0	99.1
1,2-DCA	1,000			1.25	2.75
Chloroethane	13,000			16.2	35.8
Trichloroethene (TCE)	2,000			2.50	5.51
cis-1,2-DCE	1,000			1.25	2.75
trans-1,2-DCE	1,000			1.25	2.75
1,1-DCE	20,000			25.0	55.1
Vinyl Chloride	1,000			1.25	2.75
Tetrachloroethylene (PCE)	1,000			1.25	2.75
Total CVOCs Removed from GWTP				445	980

Notes:
1. Dewatering period also includes 6,000 gallons extracted during week 1 of the GWTP startup to monitor removal efficiencies.
CVOC = chlorinated volatile organic compound
µg/L = microgram per liter
gpm = gallons per minute
d = day
kg = kilogram
lb = pound
GWTP = groundwater treatment plant

As noted in Section 5.6, ATI operates in compliance with emission limits and reporting requirements described in ATI's Title V Air Permit (Permit No. 22-0547-TV-01), which limits the allowable discharge of CVOCs to 18 tons. ATI's permit requires a 30-day notification for minor emissions modification. This notification for emissions from the excavated soil and extracted groundwater will be completed at least 30 days before beginning remediation activities.

7. Schedule

A conceptual project schedule is presented in Figure 7-1, which was submitted with the Design Plan. The predesign study components were completed in 2015 and are discussed in Section 2.

This report has gone through preliminary technical and process review by ATI's staff and engineers. The Remedial Action Plan was submitted to EPA in February 2016, ahead of the schedule provided in Figure 7-1 (4-15-2016), to allow ample time for discussion and review before the scheduled EPA Site visit on April 7, 2016. Comments and revisions from the Site visit and discussions with EPA have been incorporated into this final work plan to be submitted no later than June 15, 2016. The excavation project is targeted to take place in the late summer of 2016 with a final remedial action report to be submitted to EPA in late 2016.

8. Reporting

Three documents will be submitted to EPA as part of the source area soil removal project:

- **Remedial Design Work Plan.** Submitted to EPA on April 27, 2015, and revised after comments from EPA to ATI in a letter dated June 19, 2015, and discussions in Seattle, Washington, with EPA on July 7, 2015. The revised plan was submitted to EPA on July 10, 2015.
- **Remedial Action Plan.** This document, which is a detailed work plan for implementing the remedy.
- **Remedial Action Report.** Final report documenting remedial actions.

9. Performance Monitoring

Subsequent evaluation of the performance impacts of the remediation will be documented in future annual Fabrication Area Groundwater Remedial Action Progress Reports. ATI will include adjacent monitoring wells EI-5, I-2, and I-3 to the semiannual Acid Sump Area groundwater monitoring program to replace wells removed during the excavation. Construction logs for these added wells—showing well depth, screened interval and stratigraphy—are included in Appendix A.

Evaluation of the impact on groundwater in the source area will be presented in future annual Fabrication Area Groundwater Remedial Action Progress Reports. In addition, evaluation of the ongoing performance of the bioremediation treatment, implemented in 2007, will continue with consideration given to the potential impact from chemical oxidants applied in the source area excavation.

10. References

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